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INTRODUCTION.

This REVIEW treats generally the meteorological conditions of the United States and Canada for November, 1888, and is based upon reports of regular and voluntary observers of both countries.

On chart i the paths of the centres of six areas of low pressure are shown; the average number traced for November during the last fifteen years being 10.9.

The areas of high and low pressure are discussed under their respective headings. Descriptions of the storms that occurred over the north Atlantic Ocean are also given, and their approximate paths shown on chart i, on which also appear the limits of fog-belts west of the fortieth meridian. No ocean ice was reported during the month.

The severest disturbances on the north Atlantic occurred over mid-ocean from the 6th to the 12th, and off the coast of the United States from the 22d to the 27th, when very low barometric pressure and gales of hurricane force were reported. In the vicinity of the Banks of Newfoundland fog was less frequently reported, while to the westward of the fifty-fifth meridian its occurrence was more frequently noted than for the corresponding month of 1887.

Chart ii exhibits the distribution of mean atmospheric pressure and mean temperature for the month. The mean temperature corresponded with the normal in many parts of the country. The greatest departures above the normal occurred in the north-central states, and in Manitoba they exceeded 7°. The greatest departures below the normal were noted in the northern and southeastern Rocky Mountain slopes, where they amounted to more than 6° and 5°, respectively. At a number of stations in the interior, southern, and northeastern parts of the country the maximum temperatures were higher than for any preceding November during the periods of observation.

Chart iii exhibits normal and current temperature curves for selected stations.

The distribution of rainfall for November, 1888, is shown on chart iv, and the normal precipitation for eighteen years is exhibited on chart v.

The precipitation was above the normal from the Mississippi River westward to the Rocky Mountains, and in nearly all districts east of the Mississippi, the greatest excesses occurring in Florida, and in districts along the southwest border, where two or three times the usual November rainfall was measured. It was below the normal in the east Gulf states, and over the northern portions of the country from the upper Lake region to the Pacific coast, the most marked deficiencies occurring in the extreme northwest and on the northern slope of the Rocky Mountains, where less than one-half the usual amount fell.

Chart vi exhibits the depth of snow on the ground at the close of the month. Similar charts showing the depth of snow on the ground on the 15th and the last day of each of the winter months will be published in the REVIEW. In the current month the depth of snow on the 15th was insufficient to admit of charting. This chart also shows the limits of freezing temperature during the month.

A very heavy snow storm occurred in northern Kansas on the 9th, and heavy snow was reported in the lower Saint Lawrence valley during the night of the 8–9th.

Chart vii exhibits tracks of West Indian hurricanes along the coast of the United States, and chart viii shows the meteorological conditions which attended the severe storm of November 23d–28th.

Commencing with July, 1888, the meteorological means for stations of the Signal Service have been determined from observations taken twice daily at 8 a. m. and 8 p. m. (75th meridian time). These hours of observation have been permanently adopted to supersede the former system of tri-daily observations taken at eight-hour intervals.

In the preparation of this REVIEW the following data, received to December 20, 1888, have been used: the regular semi-daily weather-charts, containing data of simultaneous observations taken at 133 Signal Service stations and 23 Canadian stations, as telegraphed to this office; 177 monthly journals and 181 monthly means from the former and 23 monthly means from the latter; 423 monthly registers from voluntary observers; 82 monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the Hydrographic Office, United States Navy, and the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, and Texas, and the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for November, 1888, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart ii by isobars. On July 1, 1888, the tri-daily observations of the Signal Service were superseded by observations taken twice daily at the hours named. A protracted series of hourly observations has shown that the difference is almost inappreciable between the mean pressure obtained from two observations taken at these hours and that determined from tri-daily observations taken at eight-hour intervals.

The mean pressure for November, 1888, was highest within an area bounded by the isobar of 30.15, which extended from the middle Atlantic states westward to the middle eastern Rocky Mountain slope and thence northwestward to the head-